**QUIZ NAVIGATION**

Rose Wang

1 2 3 4 5
6 7 8 9 10

Show one page at a time
Finish review

| | |
|---|---|
| Started on | Sunday, 20 October 2024, 6:37 PM |
| State | Finished |
| Completed on | Sunday, 20 October 2024, 6:45 PM |
| Time taken | 8 mins 36 secs |
| Marks | 8.0/10.0 |
| Grade | **80.0** out of 100.0 |

**Question 1**
ID: 57880
Incorrect
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**The NEXT 6 QUESTIONS INCLUSIVE REFER TO THE FOLLOWING CASE:**

You are a pharmacist working at the emergency department of your local hospital. BG is a 35-year-old male with a BMI of 32 who presents for care after experiencing a 3-month history of intermittent fevers, night sweats, swelling around the neck, and weight loss. BG works as a software engineer for a large multinational business and maintains an unhealthy lifestyle of little sleep and highly processed foods. Upon inquiry, his medical history includes allergic rhinitis, migraines, alcohol use disorder, nicotine use disorder, scalp psoriasis, and gastroesophageal reflux disorder (GERD). Medications on BG's record include loratadine 10 mg PO once daily PRN for allergic symptoms, acetaminophen 1000 mg PO Q4H PRN for migraines, and pantoprazole 40 mg PO daily PRN for GERD. BG attests to drinking a 6-pack of beer nightly and has a 10-pack-year smoking history with an average of half a pack of cigarettes daily. BG is not interested in seeing any addiction services at this time to cut back on his drinking and smoking.

Which of the following are the risk factors that BG has for cancer?

Select one:

- Smoking, obesity, and occupational exposure ✖
- Genetics, smoking, and UV radiation ✖
  *Rose Wang (ID:113212) this answer is incorrect. Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, and drinking excessive amounts of alcohol. Although smoking is a risk factor for BG, he does not have any genetic or UV radiation exposure as noted risk factors.*
- Drugs, diet, and smoking ✖
- Smoking, alcohol, and obesity ✔



Incorrect
Marks for this submission: 0.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**
To recognize the risk factors associated with cancer.

**BACKGROUND:**
It is usually not possible to know exactly why an individual develops cancer and another does not, but research has shown that certain risk factors may increase a person's chances of developing cancer or specific cancers. Risk factors for cancer include exposure to chemicals or substances such as asbestos, as well as certain behaviors such as heavy alcohol use or smoking. Risk factors also include factors that individuals cannot control such as age, genetics, or family history. Most risk factors for cancer are initially identified in epidemiology studies. In these studies, scientists look at large groups of people and compare those who develop cancer with those who do not and these studies may show that people who develop cancer are more or less likely to behave in certain ways or to be exposed to certain substances than those who do not develop cancer. Such studies on their own cannot prove that a behavior or substance causes cancer but when many studies all point to a similar association between a potential risk factor and an increased risk of cancer, scientists may be more confident about the relationship between the two. Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, genetics, diet, exposure to certain drugs and drinking excessive amounts of alcohol.

**RATIONALE:**

***Correct Answer:***

- **Smoking, alcohol, and obesity** - Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, and drinking excessive amounts of alcohol.

***Incorrect Answers:***

- **Smoking, obesity, and occupational exposure** - Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, and drinking excessive amounts of alcohol. Although smoking and obesity are risk factors for BG, he does not have any occupational exposures as risk factors.
- **Genetics, smoking, and UV radiation** - Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, and drinking excessive amounts of alcohol. Although smoking is a risk factor for BG, he does not have any genetic or UV radiation exposure as noted risk factors.
- **Drugs, diet, and smoking** - Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, and drinking excessive amounts of alcohol. Although smoking and poor diet may be risk factors for BG, he does not have any notable drug exposures to increase his risk of cancer.

**TAKEAWAY/KEY POINTS:**
Leading risk factors for cancers are smoking, excessive exposure to ultraviolet (UV) or ionizing radiation, being overweight or obese, genetics, diet, exposure to certain drugs and drinking excessive amounts of alcohol.

**REFERENCE:**
[1] National Cancer Institute. Risk Factors for Cancer. National Cancer Institute. December 23, 2015. Accessed September 20, 2023. https://www.cancer.gov/about-cancer/causes-prevention/risk.

[2] Centers for Disease Control and Prevention. Cancer. Centers for Disease Control and Prevention. June 7, 2022. Accessed September 20, 2023. https://www.cdc.gov/chronicdisease/resources/publications/factsheets/cancer.htm#:~:text=Leading%20risk%20factors%20for%20preventable,and%20drinking%20too%20much%20alcohol.

The correct answer is: Smoking, alcohol, and obesity

**Question 2**
ID: 57881
Correct
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**After appropriate investigations, the team has discovered that BG has an aggressive lymphoma for which the oncologist has recommended urgent treatment with the LYCHOPR protocol (Doxorubicin, Cyclophosphamide, Vincristine, Prednisone, and Rituximab). BG tells you that he is scared of hair loss from the chemotherapy and asks you if he should expect hair loss from his treatment.**

Which of the following agents are commonly associated with hair loss?

Select one:

- Doxorubicin ✖

Cyclophosphamide ✖

Doxorubicin, cyclophosphamide, and vincristine ✔

*Rose Wang (ID:113212) this answer is correct. Doxorubicin, cyclophosphamide, and vincristine are commonly associated with hair loss.*

Rituximab ✖

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize chemotherapies commonly associated with hair loss.

**BACKGROUND:**

Cancer treatments can cause hair loss (alopecia) and change the way patients look and feel. Not all chemotherapy causes hair loss but notable examples include doxorubicin, cyclophosphamide, and vincristine. Chemotherapy can cause alopecia by damaging hair follicles responsible for hair growth. Cyclophosphamide, for example, induces apoptosis of hair follicle melanocytes to result in hair loss. Hair loss is usually temporary and may start one to three weeks after the first treatment. Hair may start to grow back six to eight weeks after the last treatment and it can take months for a patient's hair to completely grow back. Some patients may notice their hair growing back between treatments and the hair that grows back may be a slightly different color or texture. Patients may lose their hair completely or in patches and for others, it may simply become thin, dull, or dry. Patients may lose hair all over the body including on the scalp, face (eyelashes, eyebrows, and beard), arms, legs, underarms, and pelvic area. In most cases, hair loss due to chemotherapy is not preventable regardless of the care taken. Recommendations for hair and scalp care during and after cancer treatment include: being gentle with one's hair, choosing mild shampoo such as baby shampoo, using a soft hairbrush, setting the hair dryer on low heat or letting hair dry naturally, protecting the scalp from the sun outdoors, and using a satin or satin-like pillowcase to prevent hair from pulling during sleep.

**RATIONALE:**

***Correct Answer:***

- **Doxorubicin, cyclophosphamide, and vincristine** - Doxorubicin, cyclophosphamide, and vincristine are commonly associated with hair loss.

***Incorrect Answers:***

- **Doxorubicin** - Doxorubicin, cyclophosphamide, and vincristine are commonly associated with hair loss.
- **Cyclophosphamide** - Doxorubicin, cyclophosphamide, and vincristine are commonly associated with hair loss.
- **Rituximab** - Rituximab is not commonly associated with hair loss.

**TAKEAWAY/KEY POINTS:**

Doxorubicin, cyclophosphamide, and vincristine are commonly associated with hair loss.

**REFERENCE:**

[1] BC Cancer. Hair Loss & Appearance. BC Cancer. Published 2023. http://www.bccancer.bc.ca/health-info/coping-with-cancer/managing-symptoms-side-effects/hair-loss-appearance-changes#:~:text=Hair%20loss%20is%20usually%20temporary,hair%20to%20completely%20grow%20back
[2] BC Cancer Agency. Doxorubicin Monograph. BC Cancer. Published 1994. Updated August 1, 2019. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Doxorubicin_monograph.pdf
[3] BC Cancer Agency. Cyclophosphamide Monograph. BC Cancer. Published September 1994. Updated June 2013. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Cyclophosphamide_monograph_1June2013_formatted.pdf
[4] BC Cancer Agency. Vincristine Monograph. BC Cancer. Published September 1994. Updated February 2022. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Vincristine_monograph.pdf

The correct answer is: Doxorubicin, cyclophosphamide, and vincristine

**Question 3**

ID: 57882

Correct

Flag question

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**BG is very concerned about chemotherapy-induced hair loss and would like to know what to expect.**

Which of the following is true regarding hair loss with chemotherapy?

Select one:

Chemotherapy-induced hair loss typically occurs within 2-3 days after treatment is initiated ✖

Chemotherapy-induced hair loss is permanent and only occurs on the scalp ✖

Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment ✔

*Rose Wang (ID:113212) this answer is correct. Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment.*

In men, chemotherapy-induced hair loss may be prevented by initiating 5-alpha reductase inhibitors such as finasteride prior to therapy ✖

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To understand the timeframe and nature of chemotherapy-induced hair loss.

**BACKGROUND:**

Cancer treatments can cause hair loss (alopecia) and change the way patients look and feel. Not all chemotherapy causes hair loss, but notable examples include doxorubicin, cyclophosphamide, and vincristine. Chemotherapy can cause alopecia by damaging hair follicles responsible for hair growth. Cyclophosphamide, for example, induces apoptosis of hair follicle melanocytes to result in hair loss. Hair loss is usually temporary and may start one to three weeks after the first treatment. Hair may start to grow back six to eight weeks after the last treatment and it can take months for a patient's hair to completely grow back. Some patients may notice their hair growing back between treatments and the hair that grows back may be a slightly different colour or texture. Patients may lose their hair completely or in patches and for others, it may simply become thin, dull, or dry. It is also possible to lose hair all over the body including on the scalp, face (eyelashes, eyebrows, and beard), arms, legs, underarms, and pelvic area. In most cases, hair loss due to chemotherapy is not preventable regardless of the care taken. Recommendations for hair and scalp care during and after cancer treatment include: being gentle with one's hair, choosing mild shampoo such as baby shampoo, using a soft hairbrush, setting the hair dryer on low heat or letting hair dry naturally, protecting the scalp from the sun and using a satin or satin-like pillowcase to prevent pulling on hair during sleep.

**RATIONALE:**

***Correct Answer:***

- **Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment** - Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment.

***Incorrect Answers:***

- **Chemotherapy-induced hair loss typically occurs within 2-3 days after treatment is initiated** - Chemotherapy-induced hair loss typically occurs one to three weeks after treatment is initiated.
- **Chemotherapy-induced hair loss is permanent and only occurs on the scalp** - Chemotherapy-induced hair loss is usually temporary and occurs all over the body.
- **In men, chemotherapy-induced hair loss may be prevented by initiating 5-alpha reductase inhibitors such as finasteride prior to therapy** - There is no evidence to support the use of finasteride for chemotherapy-induced hair loss.

**TAKEAWAY/KEY POINTS:**

Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment.

**REFERENCE:**

[1] BC Cancer Agency. Hair Loss & Appearance. BC Cancer. Published 2023. http://www.bccancer.bc.ca/health-info/coping-with-cancer/managing-symptoms-side-effects/hair-loss-appearance-changes#:~:text=Hair%20loss%20is%20usually%20temporary,hair%20to%20completely%20grow%20back.

The correct answer is: Chemotherapy-induced hair loss is usually temporary and may start 1-3 weeks after treatment

Question 4

ID: 57883

Correct

Flag question

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**Three months after completion of the LYCHOPR protocol, BG presents to your emergency room with new onset redness, swelling, and pain on the palms of his hands and the soles of his feet. Upon visual inspection, you note the skin to be peeling and bleeding in most areas. BG endorses the pain as 9 out of 10. BG's vitals are the following: blood pressure 122/73, oral temperature 36.2, respiratory rate 16 on room air. The medical student asks for your opinion on what should be done.**

What is your recommendation?

Select one:

- The patient is experiencing cellulitis that can be managed as an outpatient. They should be sent home and instructed to start cephalexin 500 mg PO QID x 7 days ✖
- The patient is experiencing necrotizing fasciitis and should be immediately started on broad-spectrum IV antibiotics ✖
- The patient is experiencing palmar-plantar erythrodysesthesia (PPE) and can be sent home after being seen by a wound care nurse ✖
- The patient is experiencing palmar-plantar erythrodysesthesia (PPE) and should be admitted to manage their pain crisis in addition to monitoring for skin complications such as infection ✔

*Rose Wang (ID:113212) this answer is correct. The peeling, bleeding, and pain in the context of the recent LYCHOPR chemotherapy are consistent with palmar-plantar erythrodysesthesia (PPE) and the patient should be admitted to manage their pain and to investigate potential infectious causes.*

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize palmar-plantar erythrodysesthesia (PPE) as a potential dermatologic toxicity caused by chemotherapies.

**BACKGROUND:**

Palmar-plantar erythrodysesthesia (PPE) is a dermatologic toxicity characterized by tingling and tenderness developing into symmetrical redness, swelling, and pain primarily on the palms of the hands and soles of the feet. This is also known as hand and foot syndrome (HFS). Contributing factors to PPE may include exposure to chemotherapies such as capecitabine, fluorouracil (5-FU), cytarabine, docetaxel, and paclitaxel amongst others. One mechanism by which chemotherapies can cause PPE is through microvasculature toxicity which may manifest in dermatologic toxicities. A patient with PPE may have a past medical history that may include severe renal dysfunction resulting in accumulation of renally cleared chemotherapies (ex. fluorouracil or cytarabine). They may also have a history of severe hepatic dysfunction resulting in the accumulation of hepatically cleared chemotherapies (ex. docetaxel) or a history of dermatological conditions (ex. seborrheic dermatitis, actinic keratoses). Consequences of PPE may include increased risk of altered skin integrity, infection, limited use of potentially effective therapies for cancer treatment, and decreases in patient quality of life due to pain, physical and/or psychological distress, sleep-wake disturbances, and impaired mobility. Mild PPE is classified as grade 1 and includes minimal skin changes or dermatitis (e.g. erythema, edema, or hyperkeratosis) without pain. Moderate PPE is classified as grade 2 and includes skin changes (e.g. peeling, blisters, bleeding, edema, or hyperkeratosis) with pain. Normal skin to grade 1 PPE can be managed non-urgently with prevention, support, teaching, and follow-up care as required. Grade 2 PPE requires urgent medical attention within 24 hours and involves management of skin complications as they arise. Severe PPE is classified as grade 3 and includes severe skin changes (peeling, blisters, bleeding, edema, or hyperkeratosis) with pain that limits self-care activities of daily living. Grade 3 PPE requires immediate medical attention to manage pain, potential infection, and bleeding. Additionally, the presence of the following: temperature greater than or equal to 38 degrees Celsius, uncontrolled pain, blisters, and or desquamation should also be managed immediately.

**RATIONALE:**

***Correct Answer:***

- **The patient is experiencing palmar-plantar erythrodysesthesia (PPE) and should be admitted to manage their pain crisis in addition to monitoring for skin complications such as infection** - The peeling, bleeding, and pain in the context of the recent LYCHOPR chemotherapy are consistent with palmar-plantar erythrodysesthesia (PPE) and the patient should be admitted to manage their pain and to investigate potential infectious causes.

***Incorrect Answers:***

- **The patient is experiencing cellulitis that can be managed as an outpatient. They should be sent home and instructed to start cephalexin 500 mg PO QID x 7 days** - It is rare for cellulitis to present bilaterally and on both the hands and the feet concurrently. The presentation of peeling, bleeding, and pain is more consistent with palmar-plantar erythrodysesthesia (PPE) in the context of the recent LYCHOPR chemotherapy protocol.
- **The patient is experiencing necrotizing fasciitis and should be immediately started on broad-spectrum IV antibiotics** - It is rare for necrotizing fasciitis to present bilaterally and specifically on the hands and feet concurrently. The presentation of peeling, bleeding, and pain is more consistent with palmar-plantar erythrodysesthesia (PPE) in the context of the recent LYCHOPR chemotherapy protocol.
- **The patient is experiencing palmar-plantar erythrodysesthesia (PPE) and can be sent home after being seen by a wound care nurse** - The peeling, bleeding, and pain in the context of the recent LYCHOPR chemotherapy are consistent with palmar-plantar erythrodysesthesia (PPE) but the patient should not be sent home given their acute pain crisis.

**TAKEAWAY/KEY POINTS:**

Palmar-plantar erythrodysesthesia (PPE) is a dermatologic toxicity that may occur secondary to chemotherapy exposure and can be an emergent issue that requires immediate medical attention.

**REFERENCE:**

[1] Sherriff C, Buduha V, Cashman R, et al. Symptom Management Guidelines: PALMAR-PLANTAR ERYTHRODYSESTHESIA (PPE). BC Cancer Agency. Published January 2010. Updated October 2013.

http://www.bccancer.bc.ca/nursing-site/Documents/Symptom%20Management%20Guidelines/12PalmarPlantarErythrodysesthesia.pdf

The correct answer is: The patient is experiencing palmar-plantar erythrodysesthesia (PPE) and should be admitted to manage their pain crisis in addition to monitoring for skin complications such as infection

**Question 5**
ID: 57884
Correct
Flag question
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**After speaking to BG about the different grades of palmar-plantar erythrodysesthesia (PPE), he would like to know how to manage mild cases of PPE that do not require immediate medical attention.**

All of the following are appropriate recommendations except?

Select one:

- BG should assess his skin daily and monitor for early signs of PPE which include tingling and/or numbness, dry skin that becomes reddened or darker, and painless swelling or tenderness on the palms of the hands, pads of the fingers, or soles of the feet ✖
- BG should ensure that the body has adequate circulation to promote skin health by engaging in activities that raise the body temperature (e.g. steam, saunas, hot baths, heating pads, vigorous exercise) ✔

*Rose Wang (ID:113212) this answer is correct. Activities that raise the body temperature such as hot baths or showers may predispose to skin breakage and should not be recommended.*

- BG should maintain a well-balanced diet with a daily fluid intake of 8-12 cups of fluid (unless contraindicated) to help keep his skin intact ✖
- BG should avoid the use of topical anesthetics or diphenhydramine-containing creams during treatment as these may exacerbate skin toxicity ✖

Correct
Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To be able to advise patients on proper skin care and hygiene, dietary management, and pharmacological management for palmar-plantar erythrodysesthesia.

**BACKGROUND:**

Palmar-plantar erythrodysesthesia (PPE) is a dermatologic toxicity characterized by redness and pain on the palm of the hand and sole of the foot, and occasionally other body surfaces, also known as hand and foot syndrome (HFS). Consequences of PPE may include increased risk of altered skin integrity, infection, limited use of potentially effective therapies for cancer treatment, and decreases in patient quality of life due to pain, physical and/or psychological distress, sleep-wake disturbances, and impaired mobility. Proper skin care and hygiene that may be recommended to patients includes washing sweat from the skin, avoiding hot water, applying emollient creams or lotions to keep skin hydrated, using keratolytics to remove overgrown skin, and avoiding sun exposure during treatment. Health care providers may also encourage patients to have adequate hydration during treatment to prevent skin dryness/desquamation, recommend a daily fluid intake of 8-12 cups of water, and promote a well-balanced diet high in protein, and vitamins B and C. Patients should also be advised to avoid topical anesthetics or diphenhydramine-containing creams during treatment as they may exacerbate skin toxicity.

**RATIONALE:**

***Correct Answer:***

- **BG should ensure that the body has adequate circulation to promote skin health by engaging in activities that raise the body temperature (e.g. steam, saunas, hot baths, heating pads, vigorous exercise)** - Activities that raise the body temperature such as hot baths or showers may predispose to skin breakage and should not be recommended.

***Incorrect Answers:***

- **BG should assess his skin daily and monitor for early signs of PPE which include tingling and/or numbness, dry skin that becomes reddened or darker, and painless swelling or tenderness on the palms of the hands, pads of the fingers, or soles of the feet** - Patients should monitor for early signs of PPE regularly which include tingling and/or numbness, dry skin that becomes reddened or darker, and painless swelling or tenderness on the palms of the hands, pads of the fingers, or soles of the feet.
- **BG should maintain a well-balanced diet with a daily fluid intake of 8-12 cups of fluid (unless contraindicated) to help keep his skin intact** - Adequate fluid intake ensures that skin is not dry and prone to breakage. Patients should ensure a well-balanced diet with adequate fluid intake.
- **BG should avoid the use of topical anesthetics or diphenhydramine-containing creams during treatment as these may exacerbate skin toxicity** - Topical anesthetics or diphenhydramine-containing creams should not be used as they may exacerbate skin toxicity.

**TAKEAWAY/KEY POINTS:**

Grade 1 PPE may be self-managed by patients and includes proper skin care and hygiene, adequate hydration/nutrition, and avoidance of certain pharmacologic agents during treatment.

**REFERENCE:**

[1] Sheriff C, Buddha V, Cashman R, et al. Symptom Management Guidelines: PALMAR-PLANTAR ERYTHRODYSESTHESIA (PPE). Published January 2010. Updated October 2013. http://www.bccancer.bc.ca/nursing-site/Documents/Symptom%20Management%20Guidelines/12PalmarPlantarErythrodysesthesia.pdf

The correct answer is: BG should ensure that the body has adequate circulation to promote skin health by engaging in activities that raise the body temperature (e.g. steam, saunas, hot baths, heating pads, vigorous exercise)

**Question 6**
ID: 57885
Correct
Flag question
Send Feedback

**Two months after completing another round of the LYCHOPR protocol, BG presents to your emergency room with a temperature of 39 degrees Celsius, uncontrolled pain, and new blisters on his hands and feet. Upon visual inspection of BG's feet, you notice pus in the open wounds. BG's vitals are the following: blood pressure 140/90 mmHg and respiratory rate 20 breaths per minute.**

What is your course of action?

Select one:

- Ask the medical resident to order acetaminophen 650 mg PO Q4H PRN for pain ✖
- Recommend the medical resident to draw blood cultures and to have a low threshold to consider antibiotics if the patient clinically deteriorates ✔

*Rose Wang (ID:113212) this answer is correct. BG is febrile with a high temperature and has noted open wounds. There is clinical suspicion for infection at this time. As BG's blood pressure is stable, there is no immediate concern for sepsis and blood cultures should be drawn first before considering antibiotics.*

- Ask the medical resident to write a prescription for hydromorphone 0.5 to 1 mg PO q4H PRN pain and to discharge the patient home ✖
- Recommend the medical resident give the patient a vancomycin load and to start piperacillin/tazobactam as the patient is septic ✖

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To understand the initial management of palmar-plantar erythrodysesthesia cases requiring immediate medical attention.

**BACKGROUND:**

Palmar-plantar erythrodysesthesia (PPE) is a dermatologic toxicity characterized by tingling and tenderness developing into symmetrical redness, swelling, and pain primarily on the palms of the hands and soles of the feet. This is also known as hand and foot syndrome (HFS). Contributing factors to PPE may include exposure to chemotherapies such as capecitabine, fluorouracil (5-FU), cytarabine, docetaxel, and paclitaxel amongst others. One mechanism by which chemotherapies can cause PPE is through microvasculature toxicity which may manifest in dermatologic toxicities. Consequences of PPE may include increased risk of altered skin integrity, infection, limited use of potentially effective therapies for cancer treatment, and decreases in patient quality of life due to pain, physical and/or psychological distress, sleep-wake disturbances, and impaired mobility. Mild PPE is classified as grade 1 and includes minimal skin changes or dermatitis (e.g. erythema, edema, or hyperkeratosis) without pain. Moderate PPE is classified as grade 2 and includes skin changes (e.g. peeling, blisters, bleeding, edema, or hyperkeratosis) with pain. Normal skin to grade 1 PPE can be managed non-urgently with prevention, support, teaching, and follow-up care as required. Grade 2 PPE requires urgent medical attention within 24 hours and involves management of skin complications as they arise. Severe PPE is classified as grade 3 and includes severe skin changes (peeling, blisters, bleeding, edema, or hyperkeratosis) with pain that limits self-care activities of daily living. Grade 3 PPE requires immediate medical attention to manage pain, potential infection, and bleeding. Additionally, the presence of the following: temperature greater than or equal to 38 degrees Celsius, uncontrolled pain, blisters, and or desquamation should also be managed immediately.

**RATIONALE:**

***Correct Answer:***

- **Recommend the medical resident to draw blood cultures and to have a low threshold to consider antibiotics if the patient clinically deteriorates** - BG is febrile with a high temperature and has noted open wounds. There is clinical suspicion for infection at this time. As BG's blood pressure is stable, there is no immediate concern for sepsis and blood cultures should be drawn first before considering antibiotics.

***Incorrect Answers:***

- **Ask the medical resident to order acetaminophen 650 mg PO Q4H PRN for pain** - PRN acetaminophen as monotherapy without any other scheduled agents is highly unlikely to manage BG's uncontrolled pain. Uncontrolled pain typically requires opioid analgesics for control.
- **Ask the medical resident to write a prescription for hydromorphone 0.5 to 1 mg PO q4H PRN pain and to discharge the patient home** - The patient is febrile, has uncontrolled pain, and blisters with pus that require further investigation. The patient should be admitted as they are not stable enough to be managed as an outpatient at this time.
- **Recommend the medical resident give the patient a vancomycin load and to start piperacillin/tazobactam as the patient is septic** - The patient is febrile but is not demonstrating signs of sepsis as their systolic blood pressure is maintained above 100 mmHg. It would be appropriate to draw blood cultures before deciding to prescribe antibiotics.

**TAKEAWAY/KEY POINTS:**

Management of emergent cases of PPE includes addressing pain, local or systemic infection if present, and persistent bleeding if present.

**REFERENCE:**

[1] Sheriff C, Buddha V, Cashman R, et al. Symptom Management Guidelines: PALMAR-PLANTAR ERYTHRODYSESTHESIA (PPE). Published January 2010. Updated October 2013. http://www.bccancer.bc.ca/nursing-site/Documents/Symptom%20Management%20Guidelines/12PalmarPlantarErythrodysesthesia.pdf.

The correct answer is: Recommend the medical resident to draw blood cultures and to have a low threshold to consider antibiotics if the patient clinically deteriorates

**Question 7**

ID: 57887

Correct

Flag question

Send Feedback

**SJ is a 23-year-old male who presents to your pharmacist-led oncology follow-up clinic for assessment after recently starting treatment with afatinib for non-small cell lung cancer. SJ lives an otherwise extremely healthy lifestyle consisting of well-balanced meals and 1 hour of aerobic exercise daily. SJ has a noted allergy to penicillin, resulting in anaphylaxis during childhood. SJ's medical history includes acne vulgaris, migraines, psoriatic arthritis, and seasonal allergies. Medications on SS's record include hydroxychloroquine 200 mg PO daily and cetirizine 20 mg PO daily.**

During the consultation, SJ tells you he had severe acne as a teen. He is surprised that he has acne again on his cheeks and nose and asks if you could write him a prescription for benzoyl peroxide and adapalene, a medication he says worked well for his acne before. What is your recommendation for SJ?

Select one:

- Write SJ a prescription for benzoyl peroxide and adapalene to be applied to the affected areas once nightly ✖
- Inform SJ that he is likely experiencing an acneiform rash secondary to his recent afatinib treatment and refer him to a dermatologist for further assessment ✔

*Rose Wang (ID:113212) this answer is correct. EGFR tyrosine kinase inhibitors such as afatinib are known to cause rashes or dermatitis acneiform reactions in about 35-90% of patients that take the medication.*

- Inform SJ that he is experiencing a severe reaction to his afatinib treatment and that he should go to the emergency department immediately for treatment ✖
- Inform SJ that he is experiencing an adverse reaction to his cetirizine and should discontinue it immediately. ✖

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize acneiform rash as a predictable adverse effect of EGFR tyrosine kinase inhibitors.

**BACKGROUND:**

Skin-related adverse events associated with EGFR tyrosine kinase inhibitors (ex. Gefitinib, Erlotinib, Afatinib, and Lapatinib) include rash, dry skin, pruritus, and dermatitis acneiform. These targeted therapies are known to induce acneiform rashes in 10-80% of patients, typically within the first 2 weeks of therapy. These rashes can appear on the face, scalp, or chest and may be associated with erythema, edema, or papulopustular eruptions followed by crusting and dryness on the skin. Mild acneiform rash are characterized by papules and/or pustules covering < 10% BSA, which may or may not be associated with symptoms of pruritus or tenderness. Moderate acneiform rash are characterized by papules and/or pustules covering 10-30% BSA, which may or may not be associated with symptoms of pruritus or tenderness. It is associated with psychosocial impact and limitations to activities of daily living. Severe acneiform rash are characterized by papules and/or pustules covering > 30% BSA, which may or may not be associated with symptoms of pruritus or tenderness. It is associated with limitations to self-care activities of daily living or local superinfection with an indication for oral antibiotics. Life-threatening acneiform rash are characterized by papules and/or pustules covering any % BSA, which may or may not be associated with symptoms of pruritus or tenderness. It is associated with extensive superinfection with an indication for IV antibiotics. Mild to

of tenderness. It is associated with extensive superinfection with an indication for IV antibiotics. Mild to moderate cases of acneiform rash may be managed non-urgently with non-pharmacological measures such as daily assessment of skin, avoiding hot water, applying moisturizing creams or lotions, and avoiding sun exposure during treatment. Pharmacological treatment may include topical or systemic steroids, antihistamines, and topical or systemic antibiotics on a case-by-case basis.

**RATIONALE:**

***Correct Answer:***

- **Inform SJ that he is likely experiencing an acneiform rash secondary to his recent afatinib treatment and refer him to a dermatologist for further assessment** - EGFR tyrosine kinase inhibitors such as afatinib are known to cause rashes or dermatitis acneiform reactions in about 35-90% of patients that take the medication.

***Incorrect Answers:***

- **Write SJ a prescription for benzoyl peroxide and adapalene to be applied to the affected areas once nightly** - SJ is likely experiencing acne in the context of his recent afatinib treatment as it is a known adverse effect of EGFR tyrosine kinase inhibitors.
- **Inform SJ that he is experiencing a severe reaction to his afatinib treatment and that he should go to the emergency department immediately for treatment** - Acneiform rashes may be severe or life-threatening when associated with >30% body surface area affected or with systemic signs and symptoms of infection such as hypotension or fever. SJ is not experiencing any severe or life-threatening symptoms at this time and does not require a visit to the emergency department.
- **Inform SJ that he is experiencing an adverse reaction to his cetirizine and should discontinue it immediately.** - Cetirizine is not known to cause an acneiform rash and should not be discontinued for this reason at this time.

**TAKEAWAY/KEY POINTS:**

Skin-related adverse events associated with EGFR tyrosine kinase inhibitors (ex. gefitinib, erlotinib, afatinib, and lapatinib) include rash, dry skin, pruritus, and dermatitis acneiform.

**REFERENCES:**

[1] Remo K, Rosychuk J, Watt, R. Symptom Management Guidelines: Acneiform Rash. BC Cancer. Published September 2016. http://www.bccancer.bc.ca/nursing-site/Documents/1.%20Acneiform%20Rash.pdf#page=2&zoom=100,0,0

[2] BC Cancer Agency. Afatinib Monograph. BC Cancer. Published December 2014. Updated September 2019. http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Afatinib_monograph.pdf

The correct answer is: Inform SJ that he is likely experiencing an acneiform rash secondary to his recent afatinib treatment and refer him to a dermatologist for further assessment

**Question 8**

ID: 57888

Correct

Flag question

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**SJ is a 34-year-old male who visits you as part of a routine check-up at your outpatient cancer clinic. He completed his last cycle of chemotherapy 3 days ago and has noticed that his mouth and mucosal membranes have been swelling significantly ever since then. He is experiencing significant pain and discomfort and is having difficulty maintaining his daily fluid intake and talking. When asked if he has a fever, he states that he feels feverish but is unable to take his temperature as he does not have a thermometer.**

What is your recommendation for SJ?

Select one:

- Refer SJ to the emergency department for immediate evaluation ✔

  *Rose Wang (ID:113212) this answer is correct. SJ is unable to maintain his fluid intake and his speech is affected. Although SJ is unable to take his temperature, he feels febrile. These are red flags that warrant an urgent referral for evaluation.*

- Recommend SJ to go to his local pharmacy to purchase a thermometer ✖
- Recommend SJ go to his local pharmacy to purchase mouthwash containing alcohol to minimize the bacteria in his mouth and to reduce the swelling he is experiencing ✖
- Recommend SJ take acetaminophen 650 mg PO q4H PRN pain and to call you in 24 hours ✖



Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize patients presenting with oral mucositis and red flag symptoms for referral.

**BACKGROUND:**

Oral mucositis (stomatitis) is an acute inflammation and/or ulceration of the oral or oropharyngeal mucosal membranes. It can cause pain/discomfort and interfere with eating, swallowing, and speech, and may lead to infection. Factors contributing to oral mucositis may include radiation therapy to the head, neck, or salivary glands. Most chemotherapies also have the risk of causing or contributing to oral mucositis. Medications that predispose someone to xerostomia such as anticholinergics (e.g. transdermal scopolamine), antipsychotics (e.g. chlorpromazine, risperidone), antihistamines (e.g. diphenhydramine), opioids, and tricyclic antidepressants (e.g. amitriptyline), may also increase the risk of oral mucositis. Patients with oral mucositis are at increased risk for oral complications such as pain, infection (locally or systemically), bleeding, and xerostomia. Patients are also at risk for severe dehydration, malnutrition, and airway obstruction. Mild to moderate cases of oral mucositis may be managed as outpatients with close follow-up. Non-pharmacological measures such as proper oral hygiene (flossing, brushing, bland oral rinses with normal saline, and lip care with lubricants) should be recommended. Patients should be encouraged to have a daily fluid intake of 8-12 cups (2-3 liters), unless contraindicated, to keep the oral mucosa moist. Patients should also be told to avoid dry or coarse foods, spicy or hot foods, highly acidic fluids or food, and caffeine, alcohol and tobacco. Red flag signs for immediate assessment include patients who are unable to tolerate adequate daily fluid intake or those who are febrile with a temperature greater or equal to 38 degrees Celsius, have uncontrolled pain or have blisters or cracks in the oral mucosa. Management of severe to life-threatening cases of oral mucositis includes scheduled systemic analgesics to manage pain, investigations for infection and antibiotics as indicated, and monitoring for bleeding.

**RATIONALE:**

***Correct Answer:***

- **Refer SJ to the emergency department for immediate evaluation** - SJ is unable to maintain his fluid intake and his speech is affected. Although SJ is unable to take his temperature, he feels febrile. These are red flags that warrant an urgent referral for evaluation.

***Incorrect Answers:***

- **Recommend SJ to go to his local pharmacy to purchase a thermometer** - Regardless of whether or not SJ is febrile, he still needs urgent medical attention as he is unable to maintain his fluid intake and his speech is affected.
- **Recommend SJ go to his local pharmacy to purchase mouthwash containing alcohol to minimize the bacteria in his mouth and to reduce the swelling he is experiencing** - Commercial mouthwashes that contain alcohol are not recommended and may worsen symptoms.
- **Recommend SJ take acetaminophen 650 mg PO q4H PRN pain and to call you in 24 hours** - While acetaminophen may be used as adjunctive therapy in mild cases, SJ is unable to maintain his fluid intake and his speech is affected. These are red flag signs which warrant investigation, so SJ should be referred to the emergency department.

**TAKEAWAY/KEY POINTS:**

Patients who are febrile with a temperature greater than or equal to 38 degrees Celsius, have uncontrolled pain, have blisters or cracks in the oral mucosa, or are unable to tolerate adequate daily fluid intake should be referred for immediate assessment.

**REFERENCE:**

[1] Buduhan V, Cashman R, Cooper E, et al. Symptom Management Guidelines: ORAL MUCOSITIS. BC Cancer. Published January 2010. Reviewed October 2019. http://www.bccancer.bc.ca/nursing-site/Documents/12.%20Oral%20Mucositis.pdf.

The correct answer is: Refer SJ to the emergency department for immediate evaluation

**Question 9**

ID: 57878

Correct

Flag question

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**THE NEXT 2 QUESTIONS INCLUSIVE REFER TO THE FOLLOWING CASE:**

**LM is a 68-year-old female who is undergoing chemotherapy for acute myeloid leukemia in your inpatient ward. Her physician has recommended the LKGEMOZ protocol (cytarabine, daunorubicin, gemtuzumab ozogamicin) for which she has received 2 days of treatment in the 7-day cycle. She weighs 65 kg and her most recent lab tests reveal an eGFR of 80 mL/min. Upon assessment this morning, she appeared unwell to the nurse and complained of new-onset lower left limb pain. The nurse asked you to see the patient. As you palpate LM's leg, you notice that it is hot to touch, red in appearance, and painful. When you review her chart, you note that the only medications ordered for her are candesartan 8 mg PO daily for hypertension, calcium carbonate 500 mg (elemental) with vitamin D 1000 IU once daily for bone health and acetaminophen 650 mg PO q4H PRN pain. You review LM's case with the physician who orders a lower-limb ultrasound revealing a new clot. The physician asks for your thoughts on how to proceed.**

What is your recommendation for the physician?

Select one:

- Start clopidogrel 75 mg PO daily ✖
- Start warfarin 5 mg PO once daily targeting to an INR of 2-3 ✖
- Start aspirin 81 mg PO daily ✖
- Dalteparin 200 U/kg SQ once daily ✔

*Rose Wang (ID:113212) this answer is correct. Both low molecular weight heparin (LMWH) and anti-factor Xa direct oral anticoagulants (DOACs) have shown to be effective in treating DVT/PE in patients with cancer.*

Correct

Marks for this submission: 1.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize the treatment options for DVT/PE in cancer patients and the distinction between prophylactic and treatment dosing anticoagulation.

**BACKGROUND:**

Deep vein thrombosis (DVT) is when a blood clot forms in a deep vein. These clots usually form in the lower leg, thigh, or pelvis, but they can also occur in the arm. Sometimes, the DVT will break off and go to the lungs. This is called a pulmonary embolism (PE). Patients with cancer, especially those receiving chemotherapy, have a much higher risk of DVT than the average population. Patients with brain, pancreatic, stomach, and lung cancers are at the highest risk. Risk factors for clot development include patient-related factors (older age, history of clots, etc.), cancer-related factors (metastatic disease, time since diagnosis, primary tumor site, etc.), and treatment-related factors (surgery, chemotherapy, hormonal therapy, hospitalization, etc.) Patients with DVT may be asymptomatic. The most common symptoms of DVT are swelling, pain, tenderness, and erythema. Patients with cancer who are hospitalized should receive prophylactic therapy with anticoagulants such as lower molecular weight heparin (LMWH) or anti-factor Xa direct oral anticoagulants (DOACs) at lower doses to reduce the risk of clot formation. Patients who are found to have a DVT or PE should be treated with 'therapeutic dosing' or full-dose anticoagulation with the aforementioned agents. The optimal duration of therapy is generally thought to be a minimum of 3 to 6 months. At that time, continued anticoagulation is recommended if the patient meets any of the following criteria: 1) Is receiving systemic chemotherapy 2) Has metastatic disease 3) Has progressive or relapsed disease 4) Has other ongoing risk factors that increase the risk of recurrent thrombosis (e.g. central venous catheter) 5) Has a low bleeding risk Reassessment should be done every 3 to 6 months with patient preferences, quality of life, and life expectancy considered.

**RATIONALE:**

***Correct Answer:***

- **Dalteparin 200 U/kg SQ once daily** - Both low molecular weight heparin (LMWH) and anti-factor Xa direct oral anticoagulants (DOACs) have shown to be effective in treating DVT/PE in patients with cancer.

***Incorrect Answers:***

- **Start clopidogrel 75 mg PO daily** - Antiplatelet medications are not recommended in the treatment of DVT or PE.
- **Start warfarin 5 mg PO once daily targeting to an INR of 2-3** - Both low molecular weight heparin (LMWH) and anti-factor Xa direct oral anticoagulants (DOACs) have shown to be superior to warfarin in terms of efficacy, bleeding risk, and quality of life measures.
- **Start aspirin 81 mg PO daily** - Antiplatelet medications are not recommended in the treatment of DVT or PE.

**TAKEAWAY/KEY POINTS:**

DVT/PE in patients with cancer should be treated with therapeutic doses of LMWH or DOACs.

**REFERENCE:**

[1] Thrombosis Canada. Cancer and Thrombosis. Thrombosis Canada. Published Feb 20 2023. https://thrombosiscanada.ca/hcp/practice/clinical_guides?language=en-ca&guideID=CANCERANDTHROMBOSIS.

[2] Centers for Disease Control and Prevention. Blood Clots (Deep Vein Thrombosis). Centers for Disease Control and Prevention. Published May 15 2023. https://www.cdc.gov/cancer/survivors/patients/blood-clots.htm#:~:text=Sometimes%20the%20DVT%20will%20break,are%20at%20the%20highest%20risk..

The correct answer is: Dalteparin 200 U/kg SQ once daily

**Question 10**

ID: 57879

Incorrect

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**It has been 2 weeks since LM was diagnosed with a DVT. Appropriate treatment was prescribed for LM and she has improved clinically. The physician now feels comfortable with discharging her and has asked you to prepare the discharge prescriptions and determine the appropriate duration of anticoagulation therapy. LM is scheduled to receive chemotherapy during the first week of each month for the next half year.**

What is your course of action?

Select one:

- LM should receive 3 months ✖

*Rose Wang (ID:113212) this answer is incorrect.*

receive 3 months of anticoagulation

*The optimal duration of therapy for patients with cancer is generally thought to be a minimum of 3 to 6 months. Longer durations are recommended if the patient continues to receive systemic chemotherapy.*

- LM should receive ongoing anticoagulation given that she is scheduled to receive systemic chemotherapy ✔
- LM should discontinue anticoagulation on discharge ✖
- LM should receive 1 month of anticoagulation ✖

**Incorrect**

Marks for this submission: 0.0/1.0.

**TOPIC:** Oncology

**LEARNING OBJECTIVE:**

To recognize the standard duration of anticoagulation for patients with DVT/PE and cancer.

**BACKGROUND:**

Deep vein thrombosis (DVT) is when a blood clot forms in a deep vein. These clots usually form in the lower leg, thigh, or pelvis, but they can also occur in the arm. Sometimes, the DVT will break off and go to the lungs. This is called a pulmonary embolism (PE). Patients with cancer, especially those receiving chemotherapy, have a much higher risk of DVT than the average population. Patients with brain, pancreatic, stomach, and lung cancers are at the highest risk. Risk factors for clot development include patient-related factors (older age, history of clots, etc.), cancer-related factors (metastatic disease, time since diagnosis, primary tumor site, etc.), and treatment-related factors (surgery, chemotherapy, hormonal therapy, hospitalization, etc.) Patients with DVT may be asymptomatic. The most common symptoms of DVT are swelling, pain, tenderness, and erythema. Patients with cancer who are hospitalized should receive prophylactic therapy with anticoagulants such as lower molecular weight heparin (LMWH) or anti-factor Xa direct oral anticoagulants (DOACs) at lower doses to reduce the risk of clot formation. Patients who are found to have a DVT or PE should be treated with "therapeutic dosing" or full-dose anticoagulation with the aforementioned agents. The optimal duration of therapy is generally thought to be a minimum of 3 to 6 months. At that time, continued anticoagulation is recommended if the patient meets any of the following criteria: 1) Is receiving systemic chemotherapy 2) Has metastatic disease 3) Has progressive or relapsed disease 4) Has other ongoing risk factors that increase the risk of recurrent thrombosis (e.g. central venous catheter) 5) Has a low bleeding risk Reassessment should be done every 3 to 6 months with patient preferences, quality of life, and life expectancy considered.

**RATIONALE:**

***Correct Answer:***

- **LM should receive ongoing anticoagulation given that she is scheduled to receive systemic chemotherapy** - Continued anticoagulation is recommended if patients are receiving systemic anticoagulation.

***Incorrect Answers:***

- **LM should receive 3 months of anticoagulation** - The optimal duration of therapy for patients with cancer is generally thought to be a minimum of 3 to 6 months. Longer durations are recommended if the patient continues to receive systemic chemotherapy.
- **LM should discontinue anticoagulation on discharge** - The optimal duration of therapy for patients with cancer is generally thought to be a minimum of 3 to 6 months. Longer durations are recommended if the patient continues to receive systemic chemotherapy.
- **LM should receive 1 month of anticoagulation** - The optimal duration of therapy for patients with cancer is generally thought to be a minimum of 3 to 6 months. Longer durations are recommended if the patient continues to receive systemic chemotherapy.

**TAKEAWAY/KEY POINTS:**

The optimal duration of therapy for patients with cancer is generally thought to be a minimum of 3 to 6 months. Longer durations are recommended if the patient continues to receive systemic chemotherapy.

**REFERENCE:**

[1] Thrombosis Canada. Cancer and Thrombosis. Thrombosis Canada. Published Feb 20, 2023. https://thrombosiscanada.ca/hcp/practice/clinical_guides?language=en-ca&guideID=CANCERANDTHROMBOSIS.

The correct answer is: LM should receive ongoing anticoagulation given that she is scheduled to receive systemic chemotherapy

Finish review